CLAIMS

1. A scanning electron microscope, comprising an electron source; a focusing lens which focuses a primary electron beam emitted from the electron source; a porous electrode, which forms an electric field to energy-filter electrons obtained as a result of irradiation of a sample by said primary electron beam, focused by the focusing lens; and a first electron detector which detects electrons which have passed through the porous electrode; characterized in further comprising:

a porous structure, positioned nearer to said sample than said porous electrode;

a deflector, positioned nearer to said sample than the porous structure, and which deflects electrons away from the axis of said primary electron beam; and,

a second electron detector, which detects electrons deflected by the deflector.

2. The scanning electron microscope according to Claim 1, characterized in further comprising negative voltage application means, to apply a negative voltage to said sample, or means to generate an electric field in order to cause electrons obtained from said sample to reach said porous structure.

3. The scanning electron microscope according to Claim 1, characterized in that said deflector is placed in a position such that the secondary electrons obtained when electrons collide with said porous structure are deflected toward said second electron detector.

4. The scanning electron microscope according to Claim 1, characterized in that said porous structure is a mesh-shape electrode,

and that the mesh-shape electrode is formed so as to extend in directions intersecting the axis of said primary electron beam.

5. The scanning electron microscope according to Claim 4, characterized in that said porous electrode is positioned so as to be hidden by said mesh electrode, as seen from the direction of said sample.

6. The scanning electron microscope according to Claim 5, characterized in that a further mesh-shape electrode is provided on the electron source side of said porous electrode.

7. The scanning electron microscope according to Claim 5, characterized in that said mesh electrode is formed in such a way that the transmission rate of electrons obtained as a result of irradiation of said sample by said electron beam is 50%.

8. The scanning electron microscope according to Claim 1, characterized in further comprising means for computing the sum of, the difference of, or the ratio of the outputs of said first electron detector and second electron detector.

9. A scanning electron microscope, comprising:

an electron source;

a focusing lens to focus a primary electron beam emitted from the electron source;

an energy filter, formed to extend in directions intersecting said primary electron beam, and to which a negative voltage is applied;

a first electron detector, which detects electrons which have passed through the energy filter;

a mesh-shape electrode, formed so as to extend in directions intersecting said primary electron beam, and positioned on the sample side of said energy filter; and,

a second electron detector, which detects secondary electrons generated in the event of collision of secondary electrons and/or reflected electrons with the mesh-shape electrode.

10. The scanning electron microscope according to Claim 9, characterized in further comprising a deflector to guide secondary electrons, generated in the event of collision of said secondary electrons and/or reflected electrons with said mesh-shape electrode, to said second electron detector.

11. A scanning electron microscope, comprising:

an electron source;

a focusing lens to focus a primary electron beam emitted from the electron source;

an energy filter, which selectively allows those secondary electrons and/or reflected electrons obtained from a sample which have a high accelerating voltage to pass;

a detector, which detects electrons which have been subjected to energy filtering by an energy filter and electrons which have not been energy-filtered; and,

means for computing the sum of, the difference of, or the ratio of the outputs of said detector, based on the electrons which have been subjected to said energy filtering and the electrons which have not been energy-filtered.

12. A scanning electron microscope, comprising an electron source; a focusing lens which focuses a primary electron beam emitted

from the electron source; and an electron detector which detects secondary electrons and/or reflected electrons obtained from the sample; and characterized in further comprising:

an energy filter, which selectively allows those secondary electrons and/or reflected electrons obtained from the sample having a high accelerating voltage to pass;

a detector, which detects electrons which have been subjected to energy filtering by the energy filter and electrons which have not been energy-filtered; and,

a display device, which displays a sample image based on the combined output of electrons which have been subjected to said energy filtering and electrons which have not been energy-filtered.

13. A scanning electron microscope, comprising:

an electron source;

a focusing lens to focus a primary electron beam emitted from the electron source;

an energy filter, which selectively allows those secondary electrons and/or reflected electrons obtained from a sample which have a high accelerating voltage to pass;

a detector, which detects electrons which have been subjected to energy filtering by the energy filter and electrons which have not been energy-filtered;

a display device, which displays a sample image based on the output of the detector;

means to compute the ratio of the outputs of said detector, based on the electrons which have been subjected to said energy filtering and the electrons which have not been energy-filtered; and,

means to compute the number of pixels corresponding to the output ratio output by the ratio computation means.

14. A scanning electron microscope, comprising:

an electron source;

a focusing lens to focus a primary electron beam emitted from the electron source;

an energy filter, which selectively allows those secondary electrons and/or reflected electrons obtained from a sample which have a high accelerating voltage to pass;

an electron detector, which detects electrons obtained as a result of irradiation of said sample by the primary electron beam;

a display device, which displays a sample image based on the output of the electron detector; and,

computation means, which divides the number of pixels, or the area, in one of two specific portions of a sample image formed from electrons having at least two particular energies, by the sum of the numbers of pixels, or the areas, of said two specific portions.

15. A scanning electron microscope, comprising:

an accelerating cylinder, which accelerates, in the direction of an electron source, electrons obtained from irradiation of a sample by an electron beam emitted from said electron source;

a porous structure, provided within the accelerating cylinder;

a first electron detector, which detects electrons which have passed through the porous structure;

a porous electrode, positioned between the first electron detector and said porous structure, which forms an electric field to

perform energy filtering of electrons which pass through the porous electrode;

a deflector, positioned between said porous structure and said sample, to deflect electrons from the axis of the electron beam; and,

a second detector which detects electrons deflected by the deflector.

16. The scanning electron microscope according to Claim 15, characterized in that said accelerating cylinder is provided within the electron beam passage of an objective lens to focus said electron beam, and is charged with a positive voltage.

17. The scanning electron microscope according to Claim 15, characterized in that said accelerating cylinder is the upper magnetic pole of an objective lens to focus said electron beam, and that a positive voltage is applied to the upper magnetic pole.

18. The scanning electron microscope according to Claim 17, characterized in further comprising means for application of a negative voltage to said sample.